The Smart Grid- Where We are Today
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Sometime back last year we issued a decision outlining the requirements for a Smart Grid Deployment Plan investor-owned electric utilities under our jurisdiction. We've held a series of workshops with parties and, last week, we issued a Proposed Decision on Smart Grid privacy and customer access to data. The CPUC is the first governmental organization in the United States to issue proposed policies on Smart Grid privacy.

A bit of background, in 2009, the California legislature passed a bill directing the CPUC to develop requirements for a Smart Grid Deployment Plan. Specifically, we required the utilities' smart grid deployment plan to cover 8 areas:

1. Vision
2. Roadmap

3. Stragedy
4. Baseline
5. Costs
6. Benefits
7. Metrics
8. Grid and Cyber-Security Strategy

The Deployment Plan is a 10 year forecast for the utilities, detailing where they plan to be by 2020, in terms of modernizing the grid, and how they plan to get there. Within the Deployment Plan, there is the Vision statement detailing the "where"; the Roadmap detailing the "when"; and the Strategy detailing the "how."

Any 10 year forecast is challenging, but this one is especially difficult considering the pace of technology change. Historically, the electric industry has operated in decades, not years. Meters, transformers, sub-stations, and other infrastructure investments

are designed to last for 30, 40, 50 years and beyond. With the coming investments in infrastructure, those time periods will be reduced. This is a significant change. And with great change comes great challenges.

For example, two of our requirements call for Smart Grid costs and benefits estimates over 5 and 10 year horizons. The decision calls the 5 year cost and benefit estimates "provisional"- precisely because there is no telling where and what technology will be available 5 years from now. The 10 year cost and benefits estimates are described as "conceptual." Again, moving the electricity industry forward into the present and becoming more reliant upon technology will raise uncertainties in the area of costs and benefits. One of our utilities tells the story about how every 4 months they review their roadmap for future investments and what had been described as being available in 5 years has moved up significantly- all due to advances in technology. In short, the electricity industry is running head-on into Moore's Law. So, what role will the California PUC play in the upcoming years of

Smart Grid investments for our utilities? As the leading state in the US on Smart Grid investments, the California PUC will continue to play an important role, both on the policy front and on implementation of advanced technologies. But, as a major driver of Smart Grid policy in California and potentially beyond, we understand that we have a great responsibility to do things right. This can be seen through the need to properly design and enforce requirements for Cyber-Security. This is a core part of our utilities Smart Grid Deployment Plans.

Traditionally, cyber-security interests are primarily associated with the transmission grid. In the United States, the transmission grid is regulated by the Federal government, specifically by the Federal Energy Regulatory Commission, or FERC. FERC has delegated cyber-security oversight to the North American Electric Reliability Council, or NERC. However, the rules developed by NERC apply only to the transmission grid and to generation; they do not cover the distribution grid. This is the

responsibility of the CPUC and other state regulatory agencies. As Smart Grid investments move into the distribution grid, and even behind the meter, the role of the states in implementing cyber-security policies grows. By requiring our utilities to build in cyber-security at the beginning of the process, we ensure that our utilities take cyber-security seriously, as well as, hopefully, reducing costs caused by breaches in cyber security (for example, by avoiding outages, defending against cyber-attacks, and avoiding replacement of infrastructure lost to insufficient cyber policies and protocols).

In addition, the Commission is also working with several organizations established by the National Institute on Technology and Standards, or NIST. The Commission is involved in the several working groups working under the header of the Smart Grid Interoperability Panel, or S-G-I-P. The S-G-I-P was established by NIST to be a process to allow stakeholders to work on the creation of new standards and products in the Smart Grid

world. The Commission is involved in groups working on cyber-security, data access and privacy, and electric vehicles, amongst others. These groups provide invaluable opportunities for all interested parties and stakeholders, including those located outside of the United States, to join the discussion and participate in the review and development of new standards.

Turning as to the issue of privacy mentioned earlier, on May 6 we issued a proposed decision that implements privacy and third party access rules. Now, this is still only a proposed decision. Parties may provide comments and it still needs to receive final approval from my fellow commissioners. But, I expect that this decision is likely to not only be a landmark decision on Smart Grid in California, and that it will drive the debate and set a benchmark for the rest of the United States. Soon, the U.S. Congress will be introducing legislation on the same topic, while several other states have begun hearings on creating privacy and third party access rules, including Colorado

and Ohio. This decision of the California PUC will frame the debate around privacy and third party access.

Giving the customer the choice to share their usage information has long been our goal. Most recently, in 2009, the California PUC directed our utilities to provide a customer-authorized third party to be able to access a customer's usage by the end of 2010. As we have found out, though, things aren't so simple. Several privacy advocacy groups quickly intervened and argued that we must create rules to ensure that customer privacy is protected. In response to their concerns, we began a new phase of our on-going Smart Grid proceeding to investigate what privacy rules we should create, what protections should the utilities provide to customers, how should information be provided to third parties, and what level of jurisdiction do we have over these new third parties.

We seek enact progressive privacy rules to ensure that a customer's data is not released without their authorization. We also understand the need to allow innovation to occur in the market, innovation that can help customers use electricity more efficiently, save money and reduce greenhouse gas emissions. As I stated earlier, we simply cannot know what products may be developed in the future that can make use of this information to provide benefits to customers.

So, because I believe our proposed decision on privacy will be the jumping off point for most, if not all, other discussions around the US, I would like to provide you with a few of the key points from the draft decision:

1. It aligns California with the Fair Information Practice Principles, which are used throughout the United States and other countries. The Fair Information Practice Principles are a foundational set of principles, and have helped form the

various privacy requirements already in place in the banking and credit card industry

2. It puts the power in the hands of the customer. A customer will be allowed to share their information with a third party, provided that that third party meets certain minimum privacy and security requirements themselves. The California PUC expects many of these requirements to be developed as part of the S-G-I-P process.
3. It requires the utilities to notify their customers, and us, if there is a security breach affecting more than 1,000 customers.
4. It directs the utilities to provide bill-to-date, bill forecast data, projected month-end tiered rate, a rate calculator (which will allow customers to compare other rate designs to see which one works best for them), and tier notifications (this will notify customers of when they are approaching and/or have passed

their rate tier and will see a higher price for their consumption).

5. It directs the IOUs to propose a means to send customers real-time prices in relation to their tariff. In other words, utilities will provide to customers the cost of electricity, under their rate tariff, in real or near-real time.
6. It directs the IOUs to propose a pilot program around the Home Area Network, or HAN. A HAN will be instrumental in providing customers immediate feedback on their usage, allow for greater automated response to prices, event signals or other parameters chosen by the customer. There are additional findings in the decision, and I'd invite everyone to give it a read.....

Okay, now that we have had an overview of the present, and a glimpse into the future, let's take a look at what California has learned over the past several years as we've moved forward on Smart Grid and understand a bit about the foundation upon which

we have built. I'd like to share with you some of our experiences and lessons.

The first, and most important lesson we have learned is that you cannot do enough customer education. For example, to some customers, a meter isn't just a meter- it's something familiar. Without adequately explaining why it's being replaced, expect a lot of customer confusion. Often we hear from customers that these investments only benefit the utility. Utilities need to explain and reexplain how this new technology will help customers. And provide call centers with education on new technology- the call center is most likely the primary contact point between the utility and the customer; if the call center can't explain the meter or what a Smart Grid is, the customer will be dissatisfied, unhappy or worse, which makes for great media stories.

In California, we have many statutes and requirements for our utilities, for example, we're moving to 33% renewables by 2020 and our Governor has a goal of 12,000 MW of distributed generation; we have GHG emission reduction policies; and a

number of other policies that will make it challenging to run the electricity grid efficiently. Advanced metering and Smart Grid will help the utility meet these challenges more effectively and efficiently. Reducing line losses and integrating intermittent generation aren't easy stories to tell customers, many of whom likely don't even read their bill, except to see the total. So, utilities have to explain how Smart Grid help to meet these goals.

In California, a classic example of how AMI and Smart Grid provides benefits is with the growth in roof-top solar. One of our utilities is already experiencing voltage fluctuations from rooftop solar; this impacts their transformers and degrades the quality of electricity at specific locations. AMI and Smart Grid will allow the utility to better plan, monitor and react to such circumstances, and be pro-active in meeting such issues. Additionally, we are expecting dramatic increases in electric vehicles over the coming decade. This will exacerbate power quality and power flow issues on the distribution grid; a Smart Grid will provide a utility with

much needed intelligence to maintain safe and reliable electric service down to the individual transformer level.

And utilities need to articulate the new technology. So much of the Smart Grid is based on Information Technology, not on systems or utility operations. The Smart Grid will cover electric systems, communications systems and the Internet. Much of the communication across the grid will be done wirelessly, and be based on Internet Protocol. For power, utility or systems engineers, this requires learning a new skill set. Like I said earlier, the Smart Grid is a quantum leap forward in technology for the electricity industry. Utilities and their regulators must become flexible and comfortable with this change.

In closing, I hope that I've given you a better understanding of where California stands on Smart Grid. While most public discussions around Smart Grid, to date, have focused on meters, it's imperative to remember that Smart Grid is much more than just meters. It's also more than just advanced communication

and technology. Smart Grid encompasses all aspects of the grid, and this includes security and privacy. You can build the most advanced and expensive piece of equipment in the world, but if it's not secure, you've built the most advanced and expensive useless piece of equipment. And if customers and the public aren't convinced that we've secured their information and privacy, then we won't be successful. These statements aren't meant as a negative, but as a positive- as a leader on this topic, I want to see Smart Grid succeed, and there are innumerable opportunities for success. California already has seen some of the good, the bad and the ugly of all of this, and we're still looking ahead. There is so much work to be done, but, by working together and learning from each other, from experiences in California, in Australia from ENEL and others, I'm confident that we can all make Smart Grid a success. For we must, It's an imperative for a better tomorrow.